

REMARKS

This responds to the Office Action mailed on February 13, 2004. No claims have been amended in this Response. Claims 7, 62 and 79 are canceled, and claims 125-134 are added; as a result, claims 1-6, 8-61, 63-78, 80-84, and 117-134 are now pending in this application. Of these pending claims, claims 3, 5, 6, 8-13, 15-17, 20-55, 58, 60, 61, 64-72, 75, 77, 78, 81-83 and 117-124 stand withdrawn from consideration.

§103 Rejection of the Claims

Claims 1-2, 14, 56-57, 63, 73-74, 80 and 84 were rejected under 35 USC § 103(a) as being unpatentable over Shimoji et al. (U.S. 5,332,915) in view of Bass, Jr. et al. (U.S. 4,870,470). Applicant respectfully traverses.

The Office Action reasserted the following: *It would have been obvious to a person having ordinary skill in the art at the time of the invention was made to form the high dielectric film 2 including SRN as an injector medium as taught by Bass, Jr. et al. to provide good charge injecting properties that provide appreciably enhance charge conductance.* Applicant's previous response indicated that Applicant was unable to find a fair suggestion to combine the references. In response, the Office Action cited column 8, lines 37-43 of the Bass, Jr. et al. reference as evidence of a suggestion to combine the references. This portion of Bass, Jr. et al. recites:

The resulting Si-rich Si₃N₄ injector (index of refraction equal to or greater than approximately 2.35, preferably 2.40 for an R of 15) will provide appreciably enhanced charge conductance without providing appreciably enhanced charge trapping over stoichiometric Si₃N₄.

Applicant respectfully disagrees that this portion of Bass, Jr. et al. provides a fair suggestion to combine the references. Applicant respectfully asserts that the cited references do not suggest the claimed subject matter, and that the rejection does not provide a convincing line of reasoning for combining the references. "To support the conclusion that the claimed invention is directed

to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” MPEP §2142, citing *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). “When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper.” MPEP §2142, citing *Ex Parte Skinner*, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986). “The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant’s disclosure. §MPEP 2143, citing *In re Vaeck*, 947 F.2d 488, 20 USP12d 1438 (Fed. Cir. 1991). The level of skill in the art cannot be relied upon to provide the suggestion to combine references. MPEP §2141.01, citing *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

The cited portion indicates that the injector provides appreciably enhanced charge conductance. However, Applicant is unable to find a fair suggestion in the cited portion of Bass, Jr. et al. to combine the injector with a high K dielectric, as recited in the claims.

Shimoji et al. uses a mixture of a high dielectric film and an amorphous insulating film as a trap film to increase the ratio of the voltage applied to the tunnel oxidizing film so that writing and erasing operations can be effected with a low voltage. (Abstract, Column 2 lines 33-38). Applicant is unable to find a fair suggestion in the Shimoji et al. reference to combine the trap film, which comprises a mixture of a high dielectric film and an amorphous insulating film, with an injector medium.

Thus, Applicant respectfully asserts that the cited portions of the references do not provide a fair reason or motivation to combine the high K dielectric and the injector medium, along with the other elements recited in the claims. Applicant notes that, as identified in Applicant’s specification, benefits associated with the present subject matter, as recited in the claims, are not trivial. The present subject matter, such as recited in claim 1 for example, provides a gate stack with a high K dielectric, a charge storing medium and at least one charge injector medium to extend the scalability of NV technology. (Page 4 lines 20-26). Various gate stack embodiments are programmable with boot-strapped circuits without a charge pump or high voltage add-on technology. Various embodiments provide a gate stack with an equivalent oxide

thickness in the range of 5 nm - 15 nm, and a programming voltage across the stack (depending on the stack thickness) as low as 4-5 V, with a programming window of ~ 2 V. (Page 9, line 13-17). The reduced programming power provides power savings, and better endurance (Page 9, lines 18-21). The structure of the gate stack provides variables that are capable of being manipulated to scale the programmable voltages (see, for example, FIGS. 18-28, and the corresponding portions of the specification). Since the programming voltage is significantly less than the breakdown voltage of the dielectric, these variables are capable of being manipulated to achieve faster write-erase cycles. (Page 9, lines 22-27).

Applicant respectfully requests withdrawal of the rejection, and reconsideration and allowance of the claims.

Claims 4, 18-19, 59 and 76 were rejected under 35 USC § 103(a) as being unpatentable over Shimoji et al. in view of Bass, Jr. et al. as applied to claims 1, 56, 73 and 84, and further in view of Sadd et al. (U.S. 6,444,545). Applicant respectfully traverses.

In addition to the reasons provided above, Applicant is unable to find in the Shimoji et al., Bass, Jr. et al., or the Sadd et al. references, either taken alone or in combination, a fair suggestion to combine the references to form a gate stack with a tunnel medium, a high K charge blocking and charge storing medium disposed on the tunnel medium, where the high K charge blocking and charge storing medium includes nano crystals for providing charge trapping charge centers, and an injector medium operably disposed with respect to the tunnel medium and the high K charge blocking and charge storing medium to provide charge transport by enhanced tunneling.

Applicant respectfully requests withdrawal of the rejection, and reconsideration and allowance of the claims.

Allowable Subject Matter

Claims 7, 62 and 79 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In view of the final office action and the indication of allowable subject matter, claim 7 has been canceled and has been rewritten in independent claim

format as new claim 125, claim 62 has been canceled and has been rewritten in independent claim format as new claim 126, and claim 79 has been canceled and has been rewritten in independent format as new claim 127. Applicant believes that new claims 125-127 are in condition for allowance, and notice to that effect is respectfully requested.

New Claims 128-134

New claims 128-134 recite language corresponding to previously withdrawn claims 23, 34, 46, 67, 84, 117 and 124, respectively, and each of new claims 128-134 further recite silicon-rich Al_2O_3 . Applicant believes that at least new claim 125, which is believed to be in condition for allowance for including language recited in original claims 1 and 7, is generic to claims 128-134. In accordance with 37 CFR 1.141, Applicant respectfully requests consideration of these claims. Applicant believes that new claims 128-134 are in condition for allowance, and notice to that effect is respectfully requested.

Reconsideration of Withdrawn Claims

In accordance with 37 CFR 1.141, Applicant respectfully requests consideration of the claims that were withdrawn as being directed to a non-elected species upon the allowance of claim 1 or any other claim that is determined to be generic. Applicant respectfully asserts that claim 1 is patentable at least for the reason provided above.

Reservation of the Right to Swear Behind References

Applicant maintains its right to swear behind any references which are cited in a rejection under 35 U.S.C. §§102(a), 102(e), 103/102(a), and 103/102(e). Statements distinguishing the claimed subject matter over the cited references are not to be interpreted as admissions that the references are prior art.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6960 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

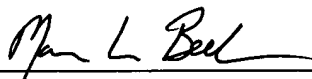
Respectfully submitted,

ARUP BHATTACHARYYA

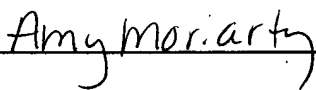
By his Representatives,

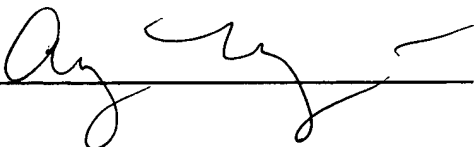
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Date 5-13-04

By 
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop RCE, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 13th day of May, 2004.


Name


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